with positive-pressure plenum ventilation systems, and a further significant reduction follows the use of impervious clothing or complex systems for preventing dispersal of bacteria from the body. What tends to be forgotten or minimized is that postoperative infection can occur by many other routes not only in the operating theatre but after the patient has returned to the ward. The dedicated research work and excellent results of J. Charnley[5] and his colleagues at the centre for hip surgery, Wrightington, are impressive, though in a recent survey of 582 cases operated on in a prototype clean-air operation room 22 infections (3·8%) occurred, and of the 13 patients with late infections eight presented with discharging sinuses. Despite the generally excellent results achieved at that centre it is still uncertain whether they depend primarily on efficient ventilation or on some of the many modifications in methods and techniques made over the years—or simply on the exceptional surgical skill of one group. Some of these problems can be answered only by a controlled large-scale trial, preferably carried out in several centres and designed to answer specific questions about the part played by bacterial contamination of operation wounds in properly designed theatres. Until such questions are clearly answered more and more hospitals will opt for highly expensive and complex equipment, which may, or may not, ultimately prove to be a wise use of limited public money.

1 O'Riordan, C., Adler, J. L., Banks, H. H., and Finland, M., *American Journal of Epidemiology*, 1972, **95**, 442.
2 Smyle, H. G., Davidson, A. I. G., Macdonald, A., and Smith, G., *British Medical Journal*, **1**, 67.
3 Davidson, A. I. G., Clark, C., and Smith, G., *British Journal of Surgery*, 1971, **58**, 333.
4 Todd, R. C., Lightowler, C. D. R., and Harris, J., *British Medical Journal*, 1972, **2**, 752.
5 Charnley, J., *Journal of Bone and Joint Surgery*, 1972, **54B**, 61.

Multiple Factors in Leukaemogenesis

We are accustomed to pay lip service to the multifactorial origin of disease. Yet epidemiological studies on the cause of human leukeameia have tended to investigate single hazards such as radiation[1] or internal defence mechanisms—for example, immunological.[2] As a preliminary investigation into possible multiple interactions underlying leukaemia a group in the departments of Biostatistics and Epidemiology at Roswell Park Memorial Institute for Cancer Research in the U.S.A. have considered the external hazard of antenatal irradiation and various "indicators" of susceptibility to leukaemia in relation to the incidence of childhood leukaemia. These indicators include a history of viral infection, bacterial infection, or allergy. A preliminary analysis of their findings has recently been reported by I. D. Bross and N. Natarajan[3] because it provides evidence of a susceptible subgroup of children who are prone to develop leukaemia after exposure to low doses of antenatal irradiation which have no effect on normal, insusceptible individuals.

Alice Stewart and her colleagues[4] in Oxford pioneered the epidemiological work showing that antenatal exposure to diagnostic *x* rays was associated with nearly double the subsequent incidence of childhood malignancy in the first 10 years of life. The report of Bross and Natarajan shows that the apparently harmful effects of antenatal *x* rays are greatly increased in certain susceptible subgroups of children possessing the indicators associated with a slightly higher intrinsic risk of leukaemia. For instance, in non-irradiated children aged 1-4 years the relative risk of developing leukaemia rises progressively from 1·7 in those with a history of chicken-pox or measles, through 2·6 in those having had bacterial diseases (pneumonia, whooping-cough, or dysentry), to 3·7 in those with a history of allergic diseases (asthma or urticaria), the rate in children without a history of any of these events being defined as unity. Antenatal exposure to diagnostic *x* rays increased the relative risk in all these groups but did so to a much greater extent in those groups with the highest intrinsic rate of leukaemia—namely, from 1·7 to 2·8 in those with a history of viral infection; from 2·6 to 8·2 in those with a history of bacterial infection; and from 3·7 to 24·6 in those with a history of allergy. The rate in the group lacking a history of these events increased from 1·0 to only 1·5.

The magnitude of this increase has several implications. Firstly, the statistical significance is more clearly demonstrable in these groups than in whole series, in which the increase in relative risk is less. This makes it more likely that the observed differences are due to a true biological effect rather than to chance extraneous influences. Secondly, it serves to emphasize the hazards of antenatal irradiation. The relative risk of 24·6 for irradiated "allergic" children under 4 years is enormous, while the corresponding figure of 8·4 for a larger series of "allergic" children between the ages of 1 and 14 years is of the same order of magnitude as that shown for the association between cigarette smoking and lung cancer or thalidomide and malformations, as these authors point out. Thirdly, the presence of a subgroup who are strongly affected by dosage level of *x* rays which has no effect on other groups (such as children aged 10-14 years who had had a virus infection) invalidates the current procedures for setting a safe level of radiation based on the assumption that the population at risk is homogeneous. A dosage that is safe for one individual could be harmful to another.

In commenting on this work B. MacMahon[5] rightly stresses that it will be important to see if these findings are confirmed by a prospective investigation designed to test the hypothesis, since it is not entirely clear from the paper why the particular indicators used were selected for analysis.

1 *British Medical Journal*, 1972, **3**, 485.
2 *British Medical Journal*, 1970, **1**, 582.
3 Bross, I. D., and Natarajan, N., *New England Journal of Medicine*, 1972, **287**, 107.
4 Stewart, A., Webb, J., and Hewitt, D., *British Medical Journal*, 1958, **1**, 1495.
5 MacMahon, B., *New England Journal of Medicine*, 1972, **287**, 144.

A Foot on the Threshold

The B.M.A. has had its eye to the window of the Common Market since Britain's first formal application to join in 1961. As the British member on the E.E.C.'s Standing Committee of Doctors,[1] the Association has watched the long drawn out discussions on the unresolved questions of free movement of doctors, period of adaptation, and the mutual recognition of qualifications, diplomas, and certificates. With Britain's entry less than three months away the B.M.A. has recently taken the first formal step toward the threshold of the enlarged community in acting as host in London to a meeting of the heads of delegations of the Standing Committee.[2]

As well as having membership on the Standing Committee, since 1967 Britain's doctors have also had spokesmen on the European Union of Medical Specialists (U.E.M.S.) and the European Union of General Practitioners (U.E.M.O.). Recently the B.M.A. accepted an invitation to appoint two permanent delegates to the U.E.M.S. and two